Suspected ectopic pregnancy

Can it be predicted by history and examination?

Samuel J. Gutman, MD, CCFP(EM) Krystaleah Lindsay, MD, ABEM

Dart RG, Kaplan B, Varaklis K. Predictive value of history and physical examination in patients with suspected ectopic pregnancy. *Ann Emerg Med* 1999;33(3):283-90.

Research question

Are there signs or symptoms on history and physical examination that could predict ectopic pregnancy (EP) in patients with abdominal pain or vaginal bleeding?

Type of article and design

Prospective observational study of consecutive female patients 18 years and older with abdominal pain or vaginal bleeding and positive results of a serum β human chorionic gonadotropin (βhCG) test, who presented to the emergency department of an urban academic medical centre.

Relevance to family physicians

In most places, family physicians are responsible for the total care of pregnant patients and are faced with the possibility of EP in their offices and in emergency departments. Ectopic pregnancy is common, affecting up to 1.7% of gestations.[1,2] Up to 15% of patients presenting to emergency departments with first-trimester abdominal pain or bleeding have EPs.[3] As many as 45% of EPs are misdiagnosed on initial presentation.[4] Ectopic pregnancy remains the leading cause of death during the first trimester and accounts for 10% of all maternal deaths.[5]

Increasing importance has been placed on ultrasound and laboratory testing to aid in diagnosis, but these services are not always readily available. Identification of reliable risk factors from the history and physical examination could be used to stratify risk and guide patient management and disposition.

Overview of study and outcomes

On weekdays during daytime hours, all patients with symptoms had a history taken, were given a physical examination, and supplied a serum βhCG sample. All patients with positive pregnancy test results had an ultrasound (US) examination, and their quantitative serum βhCG was determined. On weekends and during nights, only patients with quantitative serum βhCG levels of >1000 μIU/mL were examined by US. Patients with indeterminate US results or βhCG values <1000 μIU/mL (without US) were admitted for further evaluation. Patients were excluded from the study if they had had previous US examination or were lost to follow up. Final diagnosis was categorized as normal intrauterine pregnancy (IUP), abnormal IUP, or EP. All EPs were diagnosed by laparoscopy.

A data collection form recording 42 separate variables was completed by the most senior clinician involved in each patient's care. Each variable was dichotomized and compared with the final diagnosis of each patient. Data were analyzed using χ^2 or Fisher's exact tests. Univariate analysis evaluated possible predictive factors for EP. A Classification and Regression Tree (CART) analysis, described in detail by Dart,[11] was also applied to determine combinations of predictive variables.

Results

In all, 481 eligible patients were identified; 43 were excluded due to incomplete follow up. Of the remaining 438, 214 were diagnosed with normal IUPs, 167 with abnormal IUPs, and 57 with EPs. Because some data forms were incomplete, only 354 patients were included in the CART analysis.

Several findings were associated with higher risk of EP, including moderate-to-severe sharp pain or lateral location of pain, lateral or bilateral tenderness on abdominal or pelvic examination, and cervical motion tenderness (CMT). Signs and symptoms *not* found in this study to be statistically significant predictors of EP included tachycardia, hypotension, presence of an adnexal mass, previous EP, history of pelvic inflammatory disease, no bleeding or mild bleeding, an open cervical os, and passage of tissue.

Three groups of subjects were found to have an EP rate lower than 10%: patients with no pain or mild pain and no risk factors for EP; those with moderate-to-severe

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Dr Gutman *practises emergency medicine in the Vancouver Lower Mainland, BC.* **Dr Lindsay** *practises emergency medicine at St Paul's Hospital in Vancouver and has a clinical faculty appointment in the Department of Family Practice at the University of British Columbia.*

pain but no CMT or peritoneal signs or risk factors; and those with moderate-to-severe pain, CMT, and an open cervical os. Patients who did not fit into any of these three low-risk groups had a moderately high rate of EPs (44%). Almost half the EPs identified were found in the low-risk groups.

Analysis of methodology

Many methodologic problems must be addressed. The large number of patients lost to follow up and the lack of complete data for many patients are definite threats to internal validity. Also, the relatively small sample size might have resulted in well-known risk factors, such as prior EP (odds ratio [OR] 1.5, 95% confidence interval [CI] 0.72-3.2) or pelvic inflammatory disease[6] (OR 1.7, 95% CI 0.37-6.8) not reaching statistical significance. As the authors state, the validity of the study is also threatened by the possible inaccuracy of some of the physical examinations performed by inexperienced clinicians or residents.

A referral bias could also exist because those with a history of EP might have been admitted directly to hospital. The high rate of EPs seen in this population might limit its generalization to other populations, particularly patients seen in average office settings. Finally, some data were collected by clinicians who were not fully blinded to βhCG and US test results.

The CART analysis described in the paper is somewhat difficult to follow and is not familiar to many of us.

Application to clinical practice

There was however, value in this paper. Signs and symptoms found during history and physical examination correlated with EP, but no constellation of findings could reliably rule out EP. This observation is consistent with results of previously published studies.[4,7] Low-risk patients can be identified but the chance of EP remains substantial, even among these patients.

Decisions on need for urgent US scan or admission were based on quantitative serum βhCG levels. This approach has become controversial and is not widely supported.[3,8-11] A single quantitative βhCG value alone does not provide reliable information on risk of EP or appropriate course of management unless it is interpreted in conjunction with an endovaginal ultrasound.

Bottom line

- Constellations of signs and symptoms on history and physical examination can predict low risk of EP, but nearly half the EPs in this study occurred in the low-risk groups.
- History and physical examination alone cannot reliably rule out EP.
- All cases of possible EP, regardless of specific history and physical findings, require further laboratory or imaging studies to rule out EP.
- An interactive case presentation of EP management is available on-line at http://brighamrad.harvard.edu/Cases/bwh/hcache/94/step-0.html.

Points saillants

- Une pléiade de signes et de symptômes dans l'anamnèse et l'examen physique permettent de prédire un faible risque de grossesse ectopique (GE), mais près de la moitié des GE dans cette étude se sont produites dans des groupes à faible risque.
- On ne peut pas se fier seulement à l'anamnèse et à l'examen physique pour exclure la possibilité d'une GE.
- Tous les cas possibles de GE, quelles que soient l'anamnèse et les observations physiques spécifiques, exigent des épreuves plus approfondies en laboratoire ou en IRM pour exclure la GE.
- Une présentation interactive de cas sur la prise en charge de la GE est donnée en direct au http://brighamrad.harvard.edu/Cases/bwh/hcache/94/step-0.html.

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